

10800192

ADAPTIVE SIGNAL TERMINATION

[001] This application claims is a continuation of U.S. patent application serial no. 10/135,222, filed April 29, 2002, *is now a U.S. Patent 6,781,405* which is hereby incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

[002] Computer systems typically include devices that communicate using a bus. A bus is one or more signal paths, or transmission lines, that carry signals, from a sending device to a receiving device. Both the sending and receiving devices may be integrated circuits. Buses are also used to carry signal from sending and receiving devices that are located on the same integrated circuit.

[003] The speed and integrity of the transmission of signals over the bus is often of critical importance to the operation of the devices and the overall system. Signal reflection can interfere with the signal transmissions. Signal reflections are created when there are impedance mismatches, or discontinuities in the system. For example, signal reflections can be created when a signal is transmitted over a transmission line that interfaces with a component that has an impedance which differs from the characteristic impedance of the transmission line. Reflected signals are problematic because they can interfere with transmitted signals and affect the integrity of the transmitted signal. One method to deal with this issue is to delay sending or receiving subsequent transmitted signals until the reflections from the previous transmitted signal have subsided. The disadvantage to this approach is that it limits the speed and the efficiency of the devices and the overall system.

[004] Another approach is to employ transmission line terminators. A terminator is a dissipative load, typically a resistor, located at or near the end of a transmission line. Generally, a terminator is selected having an impedance that is matched to the characteristic impedance of the transmission line.

[005] Transmission line termination may be done on or off chip. When "off-chip" termination is used, the signal is terminated by termination circuitry that is located outside of or "off" the integrated circuit receiving the transmitted signal. When "on-chip" termination is employed, the signal is terminated by termination circuitry which is located "on" or within the integrated circuit.